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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER UMEZ ERONINI, LYNETTE T				
ART UNIT		PAPER NUMBER		
1765				

DATE MAILED: 04/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/030,424

Applicant(s)

YONEDA ET AL.

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 11-13 and 28-30 is/are pending in the application.
- 4a) Of the above claim(s) 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 28-30 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: <u>11/18/2003</u> |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This communication is in response to applicants' remarks (in Amendment, filed). Applicants presented persuasive arguments, which show that the 102(b) rejection of claims 1-3, 7, and 11 over Avanzino (US 5,916,855) lacks the R'-X group of the molecule represented by formula (I) in independent Claim 1. Hence, a new office action is presented herein.

Election/Restrictions

1. Newly submitted process of making (a polishing liquid) claims 28-30 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the process as claimed can be used to make other and materially different product such as one that does not require a compound having the structural formula (I) and (II) as recited in claims 1 and 6 respectively and an organic acid of the etching agent as recited in claim 5.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 28-31 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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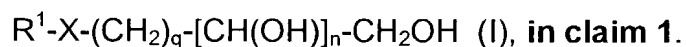
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 3, 7, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimoto et al. (US 6,383,240).

Nishimoto teaches an aqueous dispersion for CMP that comprises abrasive particles, an amphipathic compound and water (column 65-67). The amphipathic compound includes diols of 12-18 carbons and triols of 12-18 carbons (column 3, lines 32-36), which reads on a polishing liquid compos that comprising a compound having a structure in which each of two or more adjacent carbon atoms has a hydroxyl group in a molecule; and water.

Nishimoto differs in failing to teach wherein the compound having a structure in which each of two or more adjacent carbon atoms has a hydroxyl group in a molecule is represented by the formula,



Nishimoto uses an aqueous dispersion for CMP, which a boundary film that is composed of an amphiphathic compound to inhibit the production of solids due to escape of moisture from the gas-liquid interface during storage or from the aqueous dispersion adhering to the upper wall on the container during transport (column 1 line 65 - column 2, line 20).

It would have been obvious to one having ordinary skill in the art to employ amphipathic compound that includes suitable diols and triols, as taught by Nishimoto for the purpose of maintaining excellent polishing performance by using an aqueous dispersion for CMP that has low generation of abrasive particles or the like during storage and transport (column 1, lines 52-57).

Nishimoto further teaches, the aqueous dispersion may also contain an oxidizing agent (column 5, lines 6-17) and a combination of inorganic and organic acids (column 5, lines 29-48), which reads on,

The polishing liquid composition further comprising an organic acid, **in claim 2**; and an oxidizing agent and abrasive, **in claim 7**.

Since Nishimoto's aqueous dispersion for CMP comprises the same inorganic and inorganic acids as those of the claimed invention, then using Nishimoto's acids in the same manner as the claimed invention would result in the organic acid is an etching agent, **in claim 3**; and an etching agent comprising an inorganic acid, **in claim 4**.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 5 and 12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kaufman (US '489).

In Kaufman's Description of the Art, "In a typical process, via holes are etched through an interlevel dielectric (ILD) to interconnection lines . . . Next, a thin adhesion layer . . . is generally formed over the ILD and is directed into the etched via hole. Deposition is continued until the via hole is filled with the blanket deposited metal. Finally, the excess metal is removed by chemical mechanical polishing, (CMP) to form

metal vias" (column 1, lines 49-54 and 56-59). Kaufman further teaches, "A chemical mechanical polishing slurry comprising at least two oxidizing agents, an organic acid and an abrasive . . ." (Abstract). "The CMP slurry of this invention includes an organic acid. A wide range of conventional organic acids, salts or organic acids, and mixtures thereof are useful in the CMP slurry of the present invention to enhance the selectivity of oxide polishing rate. . . . Preferably the organic acid is selected from the group of acetic acid (same as applicant's organic etching acid), . . . lauric acid, . . . myristic acid, . . . palmitic acid, . . . stearic acid (same as applicant's aliphatic carboxylic acid having 7 to 24 carbon atoms), . . ." (column 6, lines 7-14). "The CMP slurry may be produced using techniques known to those skilled in the art. Typically, the oxidizing agent and any optional additives, are mixed into the aqueous medium, such as deionized or distilled water, . . ." (column 7, lines 55-61). Kaufman further teaches, "The organic acid or salt should be present in the final CMP slurry, individually or in combination with other organic acids or salts, . . ." (column 6, lines 15-19). The aforementioned reads on,

A polishing liquid composition for polishing a surface to be polished comprising an insulating layer and a metal layer, the polishing liquid composition comprising:

an aliphatic carboxylic acid having 7 to 24 carbon atoms, an etching agent comprising an organic acid, and water, wherein the organic acid of the etching agent is at least one selected from the group consisting of A: aliphatic organic acids having 6 or less carbon atoms and one to three carboxyl groups, **in claim 5**; and

an oxidizing agent, an abrasive or a mixture thereof, **in claim 12**.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claim 6 and 13 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Kaufman et al. (US 6,063,306).

In Kaufman's Description of the Art, "In a typical process, via holes are etched through an interlevel dielectric (ILD) to interconnection lines . . . Next, a thin adhesion layer . . . is generally formed over the ILD and is directed into the etched via hole. Deposition is continued until the via hole is filled with the blanket deposited metal. Finally, the excess metal is removed by chemical mechanical polishing, (CMP) to form metal vias" (column 1, lines 55-65). Kaufman further teaches, ". . . a first aqueous chemical mechanical polishing slurry comprising at least one abrasive, at least one oxidizing agent, at least one complexing agent and at least one organic amino compound . . ." (column 1, lines 10-12). "Useful complexing agents include but about are not limited to acids such as citric, acetic, oxalic and other acids, as well as amino acid . . . phosphoric acids (same as applicant's etching agent), . . . A preferred complexing agent is acetic acid" (column 8, lines 11-16). "Preferred organic amino compounds are long chain alkylamines and alcoholamines. . . for example, nonylamine

and dodecylamine (same as applicant's formula (II), in the present claim 6)” (column 6, lines 9-18). “A preferred oxidizing agent is hydrogen peroxide” (column 8, lines 1-2). The aforementioned reads on,

A polishing liquid composition for polishing a surface to be polished comprising an insulating layer and a metal layer, the polishing liquid composition comprising: an amine compound represented by formula (II) as recited in claim 6, an etching agent, an oxidizing agent, and water, **in claim 6**; and an oxidizing agent, an abrasive or a mixture thereof, **in claim 13**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 571-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

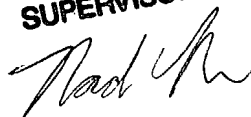
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March 31, 2004

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

A handwritten signature in cursive script, appearing to read "Nadine", followed by a stylized flourish or initial.